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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/816,046	04/01/2004	Paolo Boccazzi	0492611-0544 (MIT 10633)	9627

24280 7590 04/24/2008

CHOATE, HALL & STEWART LLP
TWO INTERNATIONAL PLACE
BOSTON, MA 02110

EXAMINER	
BOWERS, NATHAN ANDREW	

ART UNIT	PAPER NUMBER
1797	

NOTIFICATION DATE	DELIVERY MODE
04/24/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@choate.com

Office Action Summary	Application No.	Applicant(s)	
	10/816,046	BOCCAZZI ET AL.	
	Examiner	Art Unit	
	NATHAN A. BOWERS	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 January 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-117* is/are pending in the application.

4a) Of the above claim(s) *69-117* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 14-68* is/are rejected.

7)☒ Claim(s) *12 and 13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *01 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, claims 1-68 in the reply filed on 22 January 2008 is acknowledged.

Claims 69-117 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 22 January 2008.

Priority

Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed applications, Application No. 10/427,373 fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application. Specifically, the

specification and figures of the above referenced application lack sufficient detail so that one skilled in the art can reasonably conclude the inventor had possession of the invention as claimed. Application No. 10/427,373 does not disclose the use of a tray for supporting a plurality of microreactors such that the tray and a supporting component are movable with respect to one another.

Therefore, claims drawn to these limitations are not entitled to the benefit of the prior applications, and the effective filing date of the claimed invention is April 1, 2004.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 6-8, 15, 17, 22-27, 30-32, 34, 37-43, 45-50, 63-66 and 68 are rejected under 35 U.S.C. 102(b) as being anticipated by Sheppard Jr. (US 20020076804).

With respect to claims 1, 17, 24, 25 and 49, Sheppard Jr. discloses an apparatus for parallel operation of a plurality of microreactors. Sheppard Jr. teaches that a microreactor tray in the form of a disk is positioned within a chamber during fluid handling and detection procedures. Each tray (disk) includes a plurality of microreactor units (Figure 2) arranged radially about the circumference of the tray (disk). Paragraph [0086] indicates that the tray is rotatable about a central axis to affect fluid flow, and to

position each microreactor unit in alignment with a detection device. The microreactor tray is supported by a rotating means such as a spindle. An optical detection device comprising a light source (Figure 6A:65) and a photodetector (Figure 6A:68) is used to measure luminescence in each of the microreactor units. The optical detection device represents a signal transmission device capable of obtaining information from the microreactor units and relaying that information to a data processing system. Paragraph [0081] states that the detection system is moved using an actuator (Figure 6A:71) in order to perfect alignment with a microreactor unit.

With respect to claim 2, Sheppard Jr. discloses the apparatus in claim 1 wherein the microreactor tray (disk) is removable from the rotating means inside the chamber. In paragraph [0086], Sheppard Jr. states that the disk comprises an orifice that is fitted upon a spindle acting as a support element.

With respect to claims 3 and 4, Sheppard Jr. discloses the apparatus in claim 1 wherein the support elements are posts that extend upward from the floor of the apparatus. Spindles are considered to be posts that project upward such that the tip is in communication with components of a disk.

With respect to claims 6-8, Sheppard Jr. discloses the apparatus in claim 1 wherein an actuating device (Figure 7:87) is used to rotate the microreactor tray. Paragraph [0084] states that this actuating device is a motor. Although not expressly stated, the motor must be supported by some element within the chamber. As previously noted, information obtained by the optical detection system (Figure 7:81) is transmitted to a user interface (Figure 7:84) and a data memory means (Figure 7:85).

With respect to claim 15, Sheppard Jr. discloses the apparatus in claim 8 wherein the actuator is an electromagnetic actuator. Specifically, Sheppard Jr. indicates that the actuator is an electric motor.

With respect to claims 22 and 23, Sheppard Jr. discloses the apparatus in claim 1 wherein the supporting component holds a signal transmission device above and below the microreactor tray. In Figure 7, the detection system 81 is depicted as positioned above and below the microreactor tray 80.

With respect to claim 26, Sheppard Jr. discloses the apparatus in claim 24 wherein the signal transmission device comprises an optical fiber. In paragraph [0134], Sheppard Jr. teaches that optical fibers are used to guide light to and from the detection region.

With respect to claims 27, 30-32, 34, and 37-41, Sheppard Jr. discloses the apparatus in claim 24 wherein the excitation source and the detector element are operably coupled to the signal transmission device. Paragraph [0088] teaches that the excitation source is a diode laser, and that a plurality of detectors are arranged in an array. Paragraph [0039] indicates that the detectors can be photomultiplier tubes.

With respect to claim 42, Sheppard Jr. discloses the apparatus in claim 1 wherein a means for controlling temperature is provided. This is described in paragraph [0142].

With respect to claims 43 and 50, Sheppard Jr. discloses the apparatus in claim 1 wherein the chamber comprises inlet and outlet ports. The microreactor tray (disk) is moved through the inlet and outlet ports of the chamber in order to interact with the

spindle and optical detection means. The chamber certainly includes a lid or top cover member to shield the microreactor tray from contaminants and foreign interference.

With respect to claims 45-48, Sheppard Jr. discloses the apparatus in claim 1 wherein an image sensor is provided in or on the supporting component. In paragraph [0100], Sheppard Jr. teaches that computer aided imaging means are used to optically monitor the microreactors.

With respect to claims 63-66 and 68, Sheppard Jr. discloses the apparatus as previously described above. A plurality of support structures are provided to secure the microreactor tray (disk) and the optical detection means. The microreactor tray is supported upon a spindle, and the optical detection means is secured using a carriage located above and below the tray. As stated above, an actuator is used to rotate the microreactor tray upon a spindle, and another actuator is used to position the light source and detector relative to the individual microreactor chambers within the tray.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1) Claims 1, 2, 6-11, 14-21, 24, 25, 27, 30-32, 34, 37, 38, 42-49, 50, 63, 64-66 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachur Jr. (US 20020197708) in view of Smethers (US 5401465).

With respect to claims 1, 24, 25, 49, 63 and 66, Bachur Jr. discloses an apparatus for parallel operation of a plurality of reactors (Figure 3:114). A chamber (Figure 3:102) is equipped with a reactor tray (Figure 4:110) capable of holding the plurality of reactors, and the chamber includes support elements that secure the reactor tray within the chamber. A supporting component holds a signal transmission device comprising a light source (Figure 4:122, 124) and a photodetector (Figure 4:126). The supporting component and the reactor tray are controllably movable with respect to one another. The tray is slidable in and out of the chamber, whereas the supporting component holding the detection system is movable in three dimensions. See Figures 3 and 4 and paragraphs [0039]-[0047]. Bachur Jr., however, does not expressly indicate that the reactors are microreactors.

Smethers discloses a luminometer comprising a chamber equipped with at least one element (Figure 4:27) for holding a microreactor tray (Figure 7:100) comprising a

plurality of microreactor wells (Figure 7:101). The supporting element and the tray are slidable in and out of the chamber in order to impart movement along a single dimension. A supporting component (Figure 1:26) holds an optical detection system above the tray. The supporting component is also movable along a plurality of guide rails (Figure 2:32, 34).

Bachur Jr. and Smethers are analogous art because they are from the same field of endeavor regarding optical detection systems.

At the time of the invention, it would have been obvious to ensure that the Bachur Jr. reactor tray is sized appropriately in order to accommodate reactors of all types of sizes. As evidenced by the Smethers reference, it is well known in the art to optically interrogate microreactors positioned upon a microreactor tray. It would have been beneficial to use the tray of Bachur Jr. to evaluate microreactors because microfluidic systems are prominent in the biochemical art, and are useful because they require small amounts of reagents, thus minimizing cost and maximizing throughput.

With respect to claims 2 and 64, Bachur Jr. and Smethers disclose the apparatuses in claims 1 and 63 wherein the microreactor tray is removable from the support elements. The trays of Bachur Jr. are fully capable of being removed by disassembling any attachment mechanism.

With respect to claims 6-11, 14, 17-21, 65 and 68, Bachur Jr. and Smethers disclose the apparatuses in claims 1 and 63. Bachur Jr. teaches that the optical

detection system is moved using a plurality of support structures each comprising an actuator. A Z-directional support (Figure 4:130), a Y-directional support (Figure 4:128) and an X-directional support (Figure 4:118) are each provided with separate actuating mechanisms. These support structures are movable with respect to the reactor tray, and serve to guide the excitation and sensing device operably close to reactors mounted on the tray. Smethers additionally discloses the use of support rods capable of constraining the movement of a optical detection support structure.

With respect to claims 15 and 16, Bachur Jr. and Smethers disclose the apparatus in claim 8 wherein the actuator is an electromagnetic actuator. Specifically, Bachur Jr. indicates that the actuator is an electric motor. Solenoids and electromagnets are additionally known in the art as effective actuating devices.

With respect to claims 27, 30-32, 34, 37 and 38, Bachur Jr. and Smethers disclose the apparatus in claim 24 wherein the excitation source and the detector element are operably coupled to the signal transmission device. Paragraph [0003] teaches that the excitation source is a diode laser, and that a photodetector is arranged corresponding to the laser.

With respect to claims 42 and 44, Bachur Jr. and Smethers disclose the apparatus in claim 1 wherein a means for controlling temperature is provided. This is

described in paragraph [0039] and [0067]. Means for controlling gas concentration with a chamber are also considered to be well known in the incubator art.

With respect to claims 43 and 50, Bachur Jr. and Smethers disclose the apparatus in claim 1 wherein the chamber comprises inlet and outlet ports. The reactor tray is moved through an inlet and outlet port as depicted in Figures 2 and 3. The chamber certainly includes a lid or top cover member to shield the microreactor tray from contaminants and foreign interference.

With respect to claims 45-48, Sheppard Jr. discloses the apparatus in claim 1 wherein an image sensor is provided in or on the supporting component. In paragraph [0100], Sheppard Jr. teaches that computer aided imaging means are used to optically monitor the microreactors.

2) Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bachur Jr. (US 20020197708) in view of Smethers (US 5401465) as applied to claim 1, and further in view of Stern (US 20020055102).

Bachur Jr. and Smethers disclose the apparatus set forth in claim 1 as set forth in the 35 U.S.C. 103 rejection above, however, do not expressly indicate how the reactor tray is attached to a movable support element.

Stern discloses an optical detection system in which a microreactor tray (Figure 27:2770) is attached to a movable support element (Figure 27:2774) comprising a

translation stage. Paragraph [0097] states that the microreactor tray is attached to the support element using hinges, pins, or other fasteners to secure the tray to the element.

Bachur Jr. and Stern are analogous art because they are from the same field of endeavor regarding optical detection systems comprising a movable translation stage.

At the time of the invention, it would have been obvious to attach the microreactor tray disclosed by Bachur Jr. to the support element of the chamber according to any known method. Stern teaches that hinges, reversible fasteners, and posts extending from the base of the support are all effective means capable of securing a tray to a movable platform.

3) Claims 28, 29, 33, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheppard Jr. (US 20020076804) as applied to claims 27 and 34.

Sheppard Jr. discloses the apparatuses set forth in claims 27 and 34 as set forth in the 35 U.S.C. 102 rejections above, however does not expressly indicate where the light source and detectors are positioned relative to the chamber. It would have been obvious to locate the excitation source and the plurality of detectors either outside the chamber or in a wall of the chamber. Each of these positions represents a mere rearrangement of parts that does not significantly alter the functionality of the device. The Sheppard Jr. reference would operate in a similar manner regardless of where the light source and photodetectors are positioned, and therefore a rearrangement of their locations does not represent a patentable difference. See MPEP 2144.04.

4) Claims 51-60 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sheppard Jr. (US 20020076804) as applied to claims 1 and 63, and further in view of Freeman (US 6653124).

With respect to claims 51-55 and 67, Sheppard Jr. discloses the apparatus set forth in claims 1 and 63 as set forth in the 35 U.S.C. 102 rejections above. In paragraph [0106], Sheppard Jr. additionally states that the volumes of the individual microreactor chambers are between 5 and 5,000 microliters. Sheppard Jr., however, does not expressly indicate that a means is provided for providing oxygen to the vessel.

Freeman discloses a microscale bioreactor comprising a plurality of microliter vessels (Figure 1:12). This is described in column 1, lines 41-52. Freeman teaches in column 23, line 61 to column 26, line 3 that inlet and outlet channels are provided for adding and removing substances from the vessels. An aeration membrane (Figure 3:40) is provided for supplying oxygen to the vessel through diffusion. Column 24, lines 25-28 and column 29, lines 46-50 indicate that the apparatus comprises dissolved oxygen measuring devices.

Sheppard Jr. and Freeman are analogous art because they are from the same field of endeavor regarding microfluidic systems.

At the time of the invention, it would have been obvious to include a gas permeable aeration membrane in the apparatus of Sheppard Jr. in order to deliver oxygen to the cell accumulation chambers. Freeman indicates that the use of these membranes provides an effective means to supply growing cells with critical gases. Since aerobic cells require oxygen in order to survive, it would have been obvious to

provide the apparatus of Sheppard Jr. with an oxygen delivery system similar to that described by Freeman.

With respect to claims 56-58, Sheppard Jr. and Freeman disclose the apparatus set forth in claim 51 as set forth in the 35 U.S.C. 103 rejections above. Additionally, both Sheppard Jr. and Freeman disclose the use of microfluidic channels extending from and in communication with the microreactor chambers.

With respect to claims 59-61, Sheppard Jr. and Freeman disclose the apparatus set forth in claim 51 as set forth in the 35 U.S.C. 103 rejections above. As previously described above, Sheppard Jr. discloses the use of an optical sensing means to measure a parameter of interest within the vessels and channels.

5) Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sheppard Jr. (US 20020076804) in view of Freeman (US 6653124) as applied to claim 51, and further in view of Gallagher (US 20030064507).

Sheppard Jr. and Freeman disclose the apparatus set forth in claim 51 as set forth in the 35 U.S.C. 103 rejection above. Sheppard Jr. and Freeman, however, do not expressly state that miniature stirbars are provided within the microreactors.

Gallagher discloses a microfluidic device comprising a plurality of chambers capable of accommodating a biochemical reaction. In paragraph [0041], Gallagher

teaches that magnetic stirbars are provided within the chambers in order to facilitate mixing.

Sheppard Jr. and Gallagher are analogous art because they are from the same field of endeavor regarding microfluidic reaction systems.

At the time of the invention, it would have been obvious incorporate magnetic stirbars within the system of Sheppard Jr. in order to better accomplish thorough mixing. Gallagher teaches that, by applying energy to allow the stirbar to rotate, mixing of fluid within a microchamber is accomplished. Adequate stirring is important in order to ensure that the reaction between available compounds has proceeded to completion.

Allowable Subject Matter

Claims 12-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to claim 12, the prior art does not disclose, in the claimed environment, a supporting component designed to contact a support structure such that the contact moves the support structure, results in the compression of a spring, and allows the supporting component to position a sensing device operably close to microreactors mounted in or on a tray. The Sheppard Jr., Bachur Jr. and Smethers references each disclose the use of supporting components designed to hold a sensing device and support structures comprising actuating devices. However, the prior art does not teach that contact between the supporting components and the support

structure results in the compression of at least one spring as the sensing device is moved close to the microreactors.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN A. BOWERS whose telephone number is (571)272-8613. The examiner can normally be reached on Monday-Friday 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gladys Corcoran can be reached on (571) 272-1214. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William H. Beisner/
Primary Examiner, Art Unit 1797

/Nathan A Bowers/
Examiner, Art Unit 1797